

POTAMOLITHUS JACUHYENSIS, N. SP.

BY H. A. PILSBRY.

Shell turbinate globose, the last whorl with a "shoulder," produced by an obtuse but distinct angulation of the whorl above its middle; solid and strong, smooth, except for light growth lines, covered with a strong, dark brown euticle, becoming reddish on the spire and green behind the outer lip. Spire low conic, whorls about $4\frac{1}{2}$, those of the spire but slightly convex, the last large, obtusely angular above, rather flattened peripherally, the base somewhat concavely tapering. Aperture large, rather dilated, oblique, livid within, becoming blue-white toward the lip and on the inner margin; peristome continuous, blunt, thickened within at the upper angle, the outer lip a little waved or sinuous, inner margin heavily calloused, rounded, a narrow columellar crescent defined by an arcuate angle. Alt. 6.5, diam. 5.3, greatest length of aperture 5 mm.

Rio Jacuhy, Rio Grande do Sul, Brazil (Dr. H. von Ihering)

This species differs from *P. lapidum* in the angular last whorl, more heavily calloused, parieto-columellar margin, much larger aperture, and the angle defining a narrow, crescentic columellar area. *P. orbigny* Pils. is more closely allied than any other known species, but in that the body whorl is more distinctly biangular, the outer lip is more expanded and distinctly varixed, etc.

The species of this genus already described by d'Orbigny and myself, came from La Plata, Parana and Uruguay rivers. The present form is interesting as being from the Jacuhy, a stream flowing into the Atlantic instead of into La Plata.

For previous references to this genus, under the names *Paludetrina*, *Lithoglyphus* and *Potamolithus*, see d'Orbigny, Amér. mérid., p. 382; E von Martens, Malak. Blätter, 1868, p. 192; H. von Ihering, Malak. Blätter (n. F.) VII, p. 96, and Pilsbry, Nautilus X, pp. 86, 119.

REMARKS ON THE AMERICAN SPECIES OF CONULUS.

BY HENRY A. PILSBRY.

In most parts of the world there occur small land snails with thin, yellow or brown glossy shells, conical, pyramidal or teocalli shaped, with the axis imperforate or barely perforated. The foot has pedal grooves and the side-teeth are thorn-shaped, with two or more points.

In North America, Europe and Siberia these shells are known as *Conulus*; in middle and South America as *Guppya*; in India and the Orient generally they bear the names *Sitala* and *Kaliella*; while still other names cover species of Polynesia, etc.

Belonging to the great family, *Zonitidæ*, these are among the least known snails of that group. The anatomy of only a few species has been investigated; the limits of specific variation are ill understood; and while it is moderately certain that there are several genera, still the boundaries and contents of them remain to be decided.

Of the several generic names mentioned above, *Conulus* of Fitzinger (1833) is the oldest,* the type thereof being the familiar, though not well known, *Helix fulva*.

Herr Reinhardt† was, I believe, the first to point out the fact that under *C. fulvus* of European authors, more than one species was included. He distinguished two: the true *C. fulvus*, living in the woods, and a new one, *C. praticola*, which is darker colored, brownish yellow, very glossy, the height very nearly equalling the diameter, whorls rounder, the keel almost wholly disappearing, the mouth less wide but higher, and the base shows distinct spiral striation. It lives in meadows.

Bourguignat,‡ dealing with the forms of southern and western Europe and northern Africa, agrees with Reinhardt as to the identity of the typical *fulvus*: and, ignoring *C. praticola*, he recognizes and defines some eight species inhabiting this area, all but two of them, *fulvus* Müll. and *Mortoni* Jeffr., being new. This, however, seems to be rather an extreme view, and it is likely that there are not more than half this number, if so many as that, in Europe.

A number of forms have been described from Japan; but, like the Japanese *Helices*, *Clausilias* and most other snails, they apparently belong to Chinese and Indian types, rather than to the *C. fulvus* group. The senior species, *H. pupula* Gould, is far larger than *fulvus*, measuring some five mm. in height.

In America, Thomas Say defined two forms: *Helix chersina*, based upon one hardly mature specimen from the Georgia Sea Islands, and *H. egena*, from a locality in the suburbs of Philadelphia. Both of these have been considered synonyms of *C. fulvus*. In 1883 Herr

*Syst. Verzeich. Oesterreich Weichtiere, p. 94. The group originally contained some *Helices* also.

†Sitzungsber. Ges. naturforsch. Freunde zu Berlin, 1883, p. 40.

Bull. Soc. Malac. de France, VII, 1890, p. 325-328, plate 8.

Reinhardt described another, *C. trochulus*, from Texas. I do not know that this has ever been noticed by any subsequent writer.

Finally, Dr. V. Sterki, that indefatigable observer of small shells, whose researches have added so much to our knowledge of American inland mollusks, described a toothed *Conulus*, the first dentate form of the genus known, as *C. fulvus* var. *dentatus*. §

The shell figured by Binney in the Manual of American Land Shells (p. 67, fig. 26), is evidently *C. fulvus*. It will be noticed that he records considerable divergence in dentition between the observations of various observers, Morse giving 18-1-18 as the formula of teeth, with 7 laterals on each side; Binney, 30-1-30, with 8 laterals, and Lehmann, 25-1-25. This, as Binney remarks, is more variation than often, if ever, occurs among individuals of one species, especially in view of the comparatively small number of teeth. The difference between the two American observations is 24 teeth in a row, the totals being 61 (Binney) and 37 (Morse). This probably indicates that two different species were under observation by the two observers. Unfortunately the limited time at my disposal, and the limited number of specimens with the soft parts dried in, has prevented me from examining the dentition, which I hope to do when more abundant material collected alive and with the animals dried in, is available. We may now notice the American forms in detail.

Conulus fulvus (Müller).

The species was originally based in part upon a larger shell of the genus *Hygromia*, but authors agree in considering as the true *fulvus* a shell much less elevated than *chersinus*, with five whorls, not so closely coiled as in the several forms of *chersinus*, the last one distinctly angular in front, the angle disappearing on the latter part of the whorl; base convex, indented and minutely perforate or subperforate at the axis. Distinguished from *chersinus* and its varieties by the fewer, wider whorls and generally less elevated contour. *Helix egena* Say seems to me to be equivalent to *fulvus*. It is widely distributed over the northern half of the Union and Canada. The Rocky Mountain and California *C. fulvus* seem to be nearly typical *fulvus*, though slightly diverging forms are present.

Conulus fulvus mortoni (Jeffreys).

Rather more depressed, the periphery of the last whorl distinctly carinated throughout; whorls about $4\frac{3}{4}$. Described from England.

§ This Journal, Vol. VII, p. 4 (May, 1893).

It occurs in Massachusetts, New York and at Hamilton, Ontario, but I have not seen this from the South or West. It is the size of typical *fulvus*, the young of which must not be mistaken for *mortoni*.

***Conulus fulvus alaskensis*, n. var.**

Similar to *C. fulvus* but with only $4\frac{1}{2}$ whorls, the last one wider; periphery a little angular in front, becoming well rounded; columellar insertion of the lip reflexed over the perforation, nearly or quite closing it. Alt. 2.6, diam. 3.25 mm. Dyea valley and Point Romanoff, Alaska (P. B. Randolph).

***Conulus chersinus* (Say).**

This is very much elevated, the height of fully mature examples exceeding the diameter, the general form being somewhat like that of an immature *Cerion*. Outlines of spire quite convex; whorls $6\frac{1}{2}$, appearing very closely coiled, as seen from above, the last only faintly angular, though in immature shells it is carinated. The base is quite convex and the umbilical perforation very narrowly open. The lunate aperture forms a less attenuated crescent than in the following variety. Alt. 3, greatest diameter 2.8 mm. This form occurs from the Sea Islands of Georgia to Florida, the specimen illustrated being from Volusia county (coll. Pilsbry and Johnson, 1894).

***Conulus chersinus trochulus* (Reinhardt).**

Similar to the preceding, but lighter colored, less elevated (though still high), the crescentic aperture narrower. Alt. 2.75, diam. 2.8 mm. New Braunfels, Texas. Though near *chersinus*, this form is not difficult to distinguish, and will probably stand as a southwestern subspecies.

***Conulus chersinus polygyratus*, n. v.**

Similar to the preceding, but less elevated, with narrower aperture; whorls over 6, very narrow, the last one bluntly but decidedly angular in front, the angle above the middle of the whorl, base peculiarly sloping below the periphery; upper surface with the lustre of silk; base glossy, with a silky band around the outer margin. Alt. 2.2, diam. 3 mm., sometimes larger. Color generally deep, brownish amber. Hamilton, Ontario (associated with *C. fulvus mortoni*); Grand Rapids, Michigan (with *C. fulvus*). Differs from typical *chersinus* and *trochulus* chiefly in the peculiar form of the base, produced by the high situation of the periphery, and the narrower aperture. The numerous narrow whorls readily distinguish it from *fulvus*.

***Conulus chersinus dentatus* (Sterki).**

Rather small, with the narrow whorls of the species, the last whorl

containing 1 to 3 low, radial teeth, forming transverse barriers on the basal wall, and appearing when the shell is viewed from the base as white radial stripes. Jackson county, Alabama, on hills (H. E. Sargent); Washington, D. C. (E. Lehnert). The radiating "teeth" are of exactly the same type found in *Gastrodonta lamellidens* Pils.—a species of very different form.

SOME STUDIES ON THE MORPHOLOGY OF THE CYCLADIDÆ.

BY DR. V. STERKI.

1. It has been said that there are two *cardinal teeth* in the right valves of *Pisidium amnicum* Müll. and *P. virginicum* Gmel., while all the other *Pisidia* have only one, and a group has been founded mainly on that character. Examination of numerous specimens of both species have shown me that that feature is only apparent. In young and half-grown shells the cardinal teeth of the right valves are single, just as in other species, only more curved, and as they grow older there is a slight indentation in the middle. There the growth of the tooth ceases, while both ends keep on growing, until at last there are apparently two teeth, which, however, can usually be seen more or less distinctly coherent, even in mature mussels. The same character has often been noticed in specimens of *P. variable* and *compressum*, where the "two teeth" were sometimes completely separated.

2. *Reversed hinges.* A few years ago Mr. Bryant Walker published some interesting notes* about abnormal hinges in *Sphaeria*. I had made some observations on the same subject, and have continued doing so since. Three different arrangements were found:

1. The posterior laterals are reversed.
2. The anterior laterals and the cardinals.
3. The whole hinge is reversed, laterals and cardinals.

As Mr. Walker says, the posterior laterals and the cardinals alone were never seen reversed, nor both pairs of laterals alone, nor did I see the anterior laterals alone, nor the cardinals alone reversed. Evidently the anterior laterals plus the cardinals form a kind of a unity, being situated in front of the ligament, and when one part of them are reversed all are so, while the posterior laterals stand alone. And the reversion does not only affect the numbers of the teeth, but their whole

*THE NAUTILUS, IX., p. 135. (April, 1896.)